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10/053,488	11/02/2001	Tyler J. McKinley	P0487	3362

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DIGIMARC CORPORATION
9405 SW GEMINI DRIVE
BEAVERTON, OR 97008

EXAMINER

CHEN, WENPENG

ART UNIT	PAPER NUMBER
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2624

DATE MAILED: 12/23/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/053,488

Applicant(s)

MCKINLEY ET AL.

Examiner

Wenpeng Chen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-34 is/are pending in the application.
- 4a) Of the above claim(s) 5-13 and 31 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-4 and 14-30, 32-34 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 November 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

Election/Restrictions

1. This application contains claims directed to the following patentably distinct species of the claimed invention:

- Species 1 corresponding to a watermarking system with prioritization method based on color plane; (the Examiner suggesting to include Claim 5, if Species 1 being elected);

- Species 2 corresponding to a watermarking system with prioritization method based on workflow; (the Examiner suggesting to include Claims 6-8 and 13, if Species 2 being elected);

- Species 3 corresponding to a watermarking system with prioritization method based on spatially-based algorithm; (the Examiner suggesting to include Claims 9-13, if Species 3 being elected);

- Species 4 corresponding to a watermarking system with prioritization method based on hardware parameters. (the Examiner suggesting to include Claims 14-18 and 32-33, if Species 4 being elected).

Evidently, each of Species 1-4 uses a very distinct prioritization method from others. Examination of any species creates extra burden to the Examiner in search of prior art.

Applicant is required under 35 U.S.C. 121 to elect a single disclosed species for prosecution on the merits to which the claims shall be restricted if no generic claim is finally held to be allowable. Currently, Claim 2 is generic to species 1 and 2 through its relation to Claims 5-8. Claim 1 is generic to species 1-4 through its relationship to Claims 5-18. Claim 30 is generic to species 2 and 4 through its relationship to Claims 31-33.

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The Examiner decides to examine the following set of claims (Claims 1-4, 19-30, and 34) with any elected species, although the set may contain other patentably distinct species.

2. Applicant is advised that a reply to this requirement must include an identification of the species that is elected consonant with this requirement, and a listing of all claims readable thereon, including any claims subsequently added. An argument that a claim is allowable or that all claims are generic is considered nonresponsive unless accompanied by an election.

Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which are written in dependent form or otherwise include all the limitations of an allowed generic claim as provided by 37 CFR 1.141. If claims are added after the election, applicant must indicate which are readable upon the elected species. MPEP § 809.02(a).

Should applicant traverse on the ground that the species are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the species to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention.

3. During a telephone conversation with Mr. Joe Meyer on 12/13/2004 a provisional election was made without traverse to prosecute the invention of Species 4, claims 1-4, 14-30, and 32-34. (No traverse was made during the conversation.) Affirmation of this election must be made by applicant in replying to this Office action. Claims 5-13 and 31 are withdrawn from

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further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

4. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Specification

5. The attempt to incorporate subject matter into this application by reference to paper of Vincent et al. (in page 36), paper of Saarinen (in page 36), paper of Fu et al. (in page 37), and paper of Haralick et al. (in page 37) is improper because they are general publications and refer to essential materials.

6. The abstract is objected.

The abstract should be in narrative form and generally limited to a single paragraph within the range of 50 to 150 words. The abstract is more than 150 words.

7. The disclosure is objected to because of the following informalities:

-- On page 13, lines 1-2, "there a number. . . need to assigned" should be corrected.

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-- On page 10, line 1, there is a typo error on line 21 on the word "segements".

-- On page 6, line 19, 'this their' needs to be corrected.

Claim Rejections - 35 USC § 112

8. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

9. Claims 2-4 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for the following reasons.

-- Because there are two "a media signal" terms (one in line 1, Claim 1 and the other in line 2, Claim 2) cited before the term "the media signal" in line 2, Claim 2, it is indefinite which the term "the media signal" refers to? Or do the two "a media signal" terms refer to the same signal?

Claim Rejections - 35 USC § 102

10. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

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The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

11. Claims 1-4 and 18-28 are rejected under 35 U.S.C. 102(e) as being anticipated by Vynne et al. (US patent 5,960,081.)

a. For Claim 1 and its dependent claims, Vynne teaches a method of segmenting a media signal for parallel watermarking operations, the method comprising:

-- sub-dividing the media signal into segments; (Fig. 6.1; column 27, lines 7-18; The images are divided into blocks.)

-- distributing the segments to parallel processors; (Fig. 7.2; column 26, line 1 to column 27, line 18; Fig. 7.2 shows the parallel processors. A group of B_{pe} blocks is sent to each processor.)

-- performing parallel digital watermark operations on the segments in the parallel processors; (column 10, lines 32-48; Fig. 7.2; column 26, line 1 to column 27, line 18)

-- analyzing a media signal to prioritize segments of the media signal for digital watermark operations on the segments, wherein the media signal segments are prioritized for digital watermark embedding operations; (column 24, line 65 to column 25, line 11; A subset $U(n)$ of blocks suitable for coding is selected using the selection criteria discussed from column 17, line 54 to column 22, line 21. The selection process is a prioritization process.)

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-- wherein the media signal segments are prioritized such that segments that are more likely to carry a readable watermark signal are given higher priority for the embedding operations; (column 8, lines 25-35; The blocks are selected based on energy of a block to generate more-likely readable watermark signal.; column 33, lines 19-23; The blocks can be selected also based on a secret key to generate more-likely readable watermark signal, when the watermark is under attack.)

-- wherein the media signal is segmented and prioritized for parallel watermark decoding operations based on probability of watermark detection; (column 22, line 22 to column 24, line 58)

-- wherein the parallel processors comprise threads of execution on one or more hardware processing units; (column 26, lines 57-68; Each segment is processed separately and then combined.)

-- wherein the watermark operations are performed by two or more watermark operation modules, and the watermark operation modules operate in parallel; (Fig. 7.2; column 10, lines 32-48; Fig. 7.2; column 26, line 1 to column 27, line 18)

-- wherein the watermark operation modules comprise a watermark generator, a perceptual analyzer and a watermark applicator. (Fig. 6.1; The part generating the signature is a watermark generator. "Criteria 612" is a perceptual analyzer. Embedder 618 is a watermark applicator. Each PE of Fig. 7.2 has the set shown in Fig. 6.1.)

b. For Claim 22, Vynne further teaches computer readable medium on which is stored instructions for performing the method of claim 1. (column 26, lines 1-54; column 27, lines 27-58; The instructions are stored in memory inside CRAY computer.)

c. For Claim 23 and its dependent claims, Vynne teaches a distributed digital watermark embedder comprising:

-- a watermark signal generator for generating a watermark from a message; (column 1, lines 43-51; Fig. 6.1; column 9, lines 45-59; The part generating the signature is a watermark generator. The signature is related with author of a document or other information which is a message. The final watermark is generated from the signature.)

-- a perceptual analyzer for perceptually analyzing a media signal and generating perceptual control parameters used to control application of the watermark to the media signal; (Fig. 6.1; "Criteria 612" is a perceptual analyzer. A subset $U(n)$ of blocks suitable for coding is selected using the selection criteria based on perceptual analysis discussed from column 17, line 54 to column 22, line 21.)

-- a watermark applicator for receiving the media signal, the watermark and the perceptual control parameters, and for applying the watermark to the media signal according to the perceptual control parameters; wherein the watermark signal generator, the perceptual analyzer and the watermark applicator operate on distributed processors, wherein the distributed processors comprises independent threads of execution; (Fig. 6.1; Fig. 7.2; column 10, lines 32-48; Fig. 7.2; column 26, line 1 to column 27, line 18; Embedder 618 is a watermark applicator. Each PE of Fig. 7.2 has the set shown in Fig. 6.1.)

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-- wherein variable watermarks are embedded in copies of a media signal by executing the perceptual analyzer on the media signal once to generate a perceptual mask that is re-used by the watermark applicator to apply different watermarks from the watermark signal generator to the copies; (column 17, line 54 to column 22, line 22; column 27, line 59 to column 28, line 10; The criteria thresholds as those listed in column 22, lines 1-9 are the mask that is used for selecting blocks for watermarking. The thresholds are adjusted based on perceptual analysis through direct view.)

-- including a media signal segmentation processor for sub-dividing a media signal into segments for parallel processing in the embedder, wherein the embedder includes plural perceptual analyzers, which operate in parallel on segments of the media signal and wherein the embedder includes plural watermark signal applicators, which operate in parallel on segments of the media signal. (Figs. 6.1 and 7.2; column 27, lines 7-18; The images are divided into blocks. The part generating the signature is a watermark generator. "Criteria 612" is a perceptual analyzer. Embedder 618 is a watermark applicator. Each PE of Fig. 7.2 has the set shown in Fig. 6.1.)

12. Claims 1-3, 14-15, 19-20, 22, 29-30 and 32-33 are rejected under 35 U.S.C. 102(e) as being anticipated by Hawkins et al. (US patent 6,389,421.)

a. For Claims 1-3, 14-15, 19-20, 22, Hawkins teaches a method of segmenting a media signal for parallel watermarking operations, the method comprising:

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-- sub-dividing the media signal into segments; (column 9, lines 10-25; column 10, lines 22-61; column 12, lines 17-39; The media signal is divided based on jobs.)

-- distributing the segments to parallel processors; (column 6, lines 26-34; column 12, lines 17-39; A single number of watermarking process is assigned per available processor.)

-- performing parallel digital watermark operations on the segments in the parallel processors; (column 6, lines 26-358; column 12, lines 17-39; A single number of watermarking process is assigned per available processor.)

-- analyzing a media signal to prioritize segments of the media signal for digital watermark operations on the segments, wherein the media signal segments are prioritized for digital watermark embedding operations; (column 10, lines 4-62; The segments are prioritized based on the user of the media signal to set a schedule.)

-- wherein the media signal is segmented into blocks based on a memory parameter of processing hardware, and the memory parameter comprises a unit of memory used to swap data into system memory in a virtual memory system; (column 10, lines 40-44; column 12, lines 25-39; The segment requested for a subsequent watermarking process depends on data-size-dependent points that is related to the characteristic of storage facility, namely the data size cannot be larger than the storage. The storage is the maximum capacity which data can be swapped for processing.)

-- wherein the parallel processors comprise threads of execution on one or more hardware processing units; (column 6, lines 26-58; column 12, lines 17-39; A single number of watermarking process is assigned per available processor.)

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-- wherein the watermark operations are performed by two or more watermark operation modules, and the watermark operation modules operate in parallel. (column 6, lines 26-58; column 12, lines 17-39; A single number of watermarking process is assigned per available processor.)

b. For Claim 22, Hawkins further teaches computer readable medium on which is stored instructions for performing the method of claim 1. (See claim 20)

c. For Claims 29-30 and 32-33, Hawkins teaches a system for parallel watermark embedding comprising:

-- a media signal pre-processor operable to receive a media signal and divide the media signal into segments for parallel watermark embedding operations; (column 9, lines 10-25; column 10, lines 22-61; column 12, lines 17-39; The media signal is divided based on jobs.)

-- a server for distributing the segments to parallel processors for parallel watermark embedding operations; (column 6, lines 26-58; column 12, lines 17-39; A single number of watermarking process is assigned per available processor.)

-- wherein the segments are prioritized for embedding operations, wherein the segments are prioritized for embedding operations based on hardware resource constraints; (column 10, lines 4-62; column 11, lines 12-26; The segments are prioritized based on a schedule. The worker thread is performed based on a resource allocation schedule which indicates hardware resource constraints.)

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-- a load balancer for distributing segments to the parallel processors based on priority.
(column 10, lines 4-62; column 11, lines 12-26; The segments are prioritized based on a schedule. The load balance is based on points allocated to users or size of data.)

Claim Rejections - 35 USC § 103

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

14. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hawkins et al. (US patent 6,389,421) as applied to Claim 14, and further in view of Peters et al. (US patent 6,374,336.)

Hawkins teaches the parent Claim 14. However, it does not teach the feature related to memory alignment boundary recited in Claim 16.

Peters teaches a method of watermarking:

-- wherein segmenting signals based on a memory parameter that comprises a memory alignment boundary. (column 10, lines 7-30)

It is desirable to process image at the correct division of data to reduce loss or degradation of data. It would have been obvious to one of ordinary skill in the art, at the time of

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the invention, to apply Peters' teaching to segment Hawkins' data based on memory alignment boundary, because the combination preserves better data quality.

15. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Vynne et al. (US patent 5,960,081) as applied to Claim 1, and further in view of Kawaguchi et al. (US patent 6,473,516.)

Vynne teaches the parent Claim 1. However, it does not teach the feature related to bit planes recited in Claim 17.

Kawaguchi teaches a method of steganography which is watermarking:

-- wherein a media signal is segmented and prioritized based on bit plane to reduce the number of bit planes of the media signal subjected to watermarking operations. (column 2, lines 32-40; column 5, lines 26-37; Watermarking is done only on some bit planes.)

It is desirable to increase information hiding capacity in watermarking. It would have been obvious to one of ordinary skill in the art, at the time of the invention, to include Kawaguchi's segmentation and prioritization method in Vynne's watermarking method, because the combination improves information hiding capacity.

16. Claim 34 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shinoda (US 6,611,830) in view of Vynne et al. (US patent 5,960,081.)

Shinoda teaches a batch digital watermark registration and embedding system comprising:

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-- a network interface for receiving ID registration requests, the requests including a list of media signal files and information to be linked with the media signal files via data embedded in the media signal files; (Fig. 1; column 1, lines 40-46; column 3, lines 7-50; column 5, lines 1-35; Many files, each having an ID, are inputted at least one by one for registration.)

-- a batch registration loader for creating records in a registration database corresponding to identifiers for each of the media signal files; (column 4, line 64 to column 5, line 35; Fig. 5 shows records in the database.)

-- a batch registration extractor for reading the registration database and creating an embedder control file, including identifiers, a corresponding list of media signal files, and embedding instructions for controlling embedding of the identifiers in the media signal files; (column 4, line 64 to column 5, line 35)

-- a digital watermark embedder for performing digital watermark embedding operations on each file to hide the identifiers in the media signal files. (column 4, line 64 to column 5, line 46)

However, Shinoda does not teach the feature related to parallel digital water embedding.

Vynne teaches a system of segmenting a media signal for parallel watermarking operations, comprising:

-- sub-dividing the media signal into segments; (Fig. 6.1; column 27, lines 7-18; The images are divided into blocks.)

-- distributing the segments to parallel processors; (Fig. 7.2; column 26, line 1 to column 27, line 18; Fig. 7.2 shows the parallel processors. A group of B_{pe} blocks is sent to each processor.)

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-- performing parallel digital watermark operations on the segments in the parallel processors. (column 10, lines 32-48; Fig. 7.2; column 26, line 1 to column 27, line 18)

It is desirable to speed up watermarking of data files. It would have been obvious to one of ordinary skill in the art, at the time of the invention, to use Vynne's parallel watermarking approach in Shinoda's system to perform parallel watermarking for a set of files, because the combination speeds up watermarking and therefore registration process. The combination thus teaches:

-- a parallel digital watermark embedder for segmenting media signal files into segments and for distributing the segments to parallel processors for performing parallel digital watermark embedding operations on the segments to hide the identifiers in the media signal files.

Conclusion

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wenpeng Chen whose telephone number is 703 306-2796. The examiner can normally be reached on 8:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David K Moore can be reached on 703 308-7452. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9306 for regular communications and 703-872-9306 for After Final communications. TC 2600's customer service number is 703-306-0377.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 305-4700.

Wenpeng Chen
Primary Examiner
Art Unit 2624

December 17, 2004

A handwritten signature in black ink, appearing to read 'Wenpeng Chen', written in a cursive style.